BLACK & VEATCH
SPECIAL PROJECTS CORP.

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USEPA Region 5
American Chemical Services 80-5PJ7

BVSPC Project 71670
BVSPC File C.3
December 2, 1996

Ms. Sheri Bianchin
U.S. Environmental Protection Agency
77 West Jackson Boulevard (HSR-6J)
Chicago, Illinois 60604

Subject: Revised Amendment to the Mini-QAPP for Independent Sampling

Dear Ms. Bianchin:

Enclosed for your review and approval are five copies of the revised Table 1-1 and amendment to the Mini-Quality Assurance Project Plan (mini-QAPP) for the American Chemical Services project. The amendment covers the collection of independent samples at the site. The original mini-QAPP was prepared for the collection of collocated groundwater samples during oversight work performed by Black & Veatch Special Projects Corp. under the ARCS contract.

If you have any questions or desire additional information, please contact me at 312/346-3775.

Sincerely,

BLACK & VEATCH SPECIAL PROJECTS CORP.

Steve Mrkvicka
Site Manager

RECEIVED
DEC 05 1996
CONTRACTS MANAGEMENT SECTION

Enclosures (5 copies)

cc: P. Hendrixson, USEPA w/o enclosures
E. Howard, USEPA w/o enclosures
L. Campbell, BVSPC w/o enclosures
A. Rupani, BVSPC w/enclosures

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# Amendment 1
# Independent Sampling Procedures

At the direction of the USEPA work assignment manager, BVSPC may be tasked to collect independent samples that will not be split with the Respondent's contractor. This amendment specifies the following procedures that will be used to collect independent samples for certain media:

- Drilling and Soil Boring Sampling Procedures.
- Soil Probe Sampling Procedures.
- Surface Soil Sampling Procedures.
- Monitoring Well Construction and Development.
- Groundwater Sampling and Hydrogeology Investigation.
- Sediment Sampling Procedures.
- Field Investigation-Derived Wastes.

## A.1 Drilling and Soil Boring Sampling Procedures

Soil borings will be drilled using hollow-stem augers with a minimum inside diameter large enough to accommodate a 3-inch outside diameter thin-walled tube sampler, continuous tube sample or a split-barrel sampler. Soil boring and sampling will be performed in accordance with American Society for Testing and Materials (ASTM) D 1452 unless otherwise agreed to by the USEPA work assignment manager. If visual contamination is encountered in soils overlying the Lower Aquifer and bedrock aquifer, permanent or temporary steel casing will be installed to isolate the contamination before drilling into the deeper aquifers.

Use of grease or other lubricants on drill bits, drill rods, sampling equipment or tools required for borings will be avoided, if possible. If grease or lubricants are needed, they will be environmentally safe, certified petroleum hydrocarbon free (Well Guard by Jet-Lube or an equivalent). Fluids and soil cuttings generated during hole advancement will be collected on plywood and plastic sheeting and containerized as outlined in Section A.8.

Ambient air conditions will be monitored during drilling using a photoionization detector (PID) or flame ionization detector (FID). Readings will be taken at the top of each borehole during drilling. The PID or FID will also be used during drilling activities to monitor organic vapors in site worker breathing zones. The BVSPC oversight health and safety plan (HASP) provides detailed information regarding breathing zone monitoring and other health and safety information.

Soil sampling will be performed with a split-barrel sampler. Resistance to soil penetration will be measured, in accordance with ASTM D 1586. A clean stainless steel knife or spoon will be used to remove soil from the sampler and to place it into appropriate sample containers or mixing bowls. Samples for volatile organic analyses will be collected first to minimize volatilization. Following collection of volatile organic samples, samples for semivolatile organic compounds, inorganic and other parameters will be collected.

A thin-walled sampler or Shelby tube may also be used to collect undisturbed samples for physical testing purposes. Thin-walled tube samples will be obtained in accordance with ASTM D 1587. Following sample recovery, the drilling subcontractor will seal the ends of sample collection tubes with wax. The drilling subcontractor will also provide a spacer, if the sample is only partially recovered. Airtight plastic caps will be taped over each end of the tubes. The drilling subcontractor will be responsible for procuring the soil laboratory to perform the physical test analyses and for transportation of samples to the laboratory.

Bedrock coring will be performed with double-tube, swivel-type, WM-design or similar core barrels, in accordance with ASTM D 2113. Core barrels will have a maximum length of 10 feet, minimum diameter of 2 inches, and will be equipped with a core lifter suitable for catching and retaining cores in soft formations. Core runs will be limited to a maximum of 5-foot lengths. Cores will be retained in boxes for future use; each box will contain cores from no more than one boring. Clean, potable water will be used to remove cuttings. If potable water is not sufficient, a biodegradable drilling mud (revert) may be used. The core barrel will be decontaminated between core runs.

If specified by the USEPA, borings will be backfilled with a cement bentonite grout. The cement-bentonite grout slurry will consist of 97 percent (by weight) cement to 3 percent high swelling bentonite mixed with 7 to 8 gallons of water per 100 pounds of cement and bentonite to yield a liquid grout weighing approximately 14 pounds per gallon. Cement will conform to ASTM C 150, Type I. Grout will be thoroughly mixed and used before stiffening occurs.

Cement-bentonite grout slurries will be installed by the tremie method, which consists of pumping the slurry down the well or annular space through a pipe. The bottom of the pipe will be placed near the bottom of the zone to be grouted and raised as the slurry is placed, keeping the bottom of the tremie pipe below the top of the slurry.

## A.2 Soil Probe Sampling Procedures

Soil probe sampling will be performed using Geoprobe® or equivalent soil sampling equipment. Soil will be continuously sampled using 2- or 4-foot stainless steel sample tubes with acetate liners.

If soil probe refusal is encountered at less than 10 feet below ground surface, the probe will be offset 1 to 2 feet and advanced a second time. Sampling at the offset location will begin at the bottom of the last interval sampled at the original location. If similar conditions are encountered at the offset probe location, the need for additional sampling will be evaluated based on the overall success of the Geoprobe® soil investigation. Soil cuttings generated during hole advancement will be collected on plywood and plastic sheeting and containerized as outlined in Section A.8.

Ambient air conditions will be monitored during probing using a PID or FID. Readings will be taken at the top of each borehole and in the breathing zone during drilling. The HASP provides detailed information regarding breathing zone monitoring and other health and safety information.

A stainless steel knife will be used to remove soil from the acetate liner and a stainless steel spoon will be used to place it into appropriate sample containers or mixing bowls. Samples for volatile organic analyses will be collected first to minimize volatilization. Following collection of the volatile organic samples, samples for semivolatile organic compounds, inorganic and other parameters will be collected.

Visual observations of the soil type and condition will be recorded in a field log book and on soil probe boring log forms. After completion of field investigation activities, the coordinate locations and ground surface elevations for soil probe locations will be surveyed.

Holes formed by the soil probe will be backfilled to 6 inches below ground surface with bentonite pellets. The pellets will be hydrated if necessary and the remaining 6 inches filled with topsoil.

Soil probe sampling equipment will be decontaminated between soil probe locations to avoid cross-contamination according to Section A.9.

## A.3 Surface Soil Sampling Procedures

Surface soil samples will be collected at 0 to 6 inches below land surface. The following procedure will be used to collect surface soil samples:

- At each location, remove vegetation and the top few inches of soil.
- Collect samples using clean stainless steel spoons and mixing bowls. Decontaminate equipment according to procedures outlined in Section A.9.
- Transfer sample portions collected for volatile organic analysis directly from the source to appropriate sample containers.
- Collect remaining sample portions for semivolatile organic, pesticide/polychlorinated biphenyl, metals, and cyanide analyses. Place in stainless steel mixing bowls and thoroughly mix before placing in appropriate sample containers.
- Restore sample locations to their previous conditions after sampling.
- Stake sample location for future reference.

## A.4 Monitoring Well Construction and Development

### *A.4.1 Well Construction*

Each monitoring well will be constructed of new Schedule 40 type 304 stainless steel pipe and screen. Sections will be joined using threaded flush-joints. No solvents or lubricants will be used during well construction. The riser pipe for monitoring wells will be 2-inch diameter. The screened section will be factory-slotted or wrapped, Schedule 40 type 304 stainless steel with 0.010-inch slots. The length of the screened interval for each well will vary from 5 to 10 feet and will be based on the presence and thickness of the water-bearing unit. A 1-foot section of blank stainless steel riser pipe will be installed below the bottom of the screen as a silt trap. A flush-threaded bottom cap will be installed at the bottom of the well and a threaded stainless steel cap will be provided for the top of the riser pipe. A dedicated stainless steel bailer suspended from the well cap will be installed in each well. Section A.9 describes decontamination procedures for well materials. Clean gloves will be used during well installation.

Washed silica sand will act as a filter around the screened section and will extend 2 feet above the top of the screened section. A 3-foot minimum bentonite pellet or comparable bentonite slurry seal will be installed directly above the washed silica sand. If water is not present in the borehole, the bentonite pellets will be hydrated after placement above the silica sand by pouring clean potable water in the annulus of the borehole. From the top of the bentonite pellet seal to approximately 2 feet below ground surface, the annulus will be backfilled with a cement-bentonite grout slurry. Cement-bentonite grout will be prepared as outlined in Section A.1. Grout will be thoroughly mixed and placed in the boring using the tremie method. A concrete surface seal will be placed 2 feet below ground surface to secure the protective steel casing installed around the riser pipe. Concrete at the surface will be formed to create a pad around the protective steel casing.

Monitoring wells in high traffic areas will be constructed flush with the ground surface. The riser pipe will be cut 2 to 3 inches below ground surface; a temporary cap will be placed on the riser pipe to prevent deleterious materials from entering the well during remaining completion activities. A protective casing, consisting of a cast-iron valve box with locking cover, will be installed. A 1.5 to 2-foot diameter concrete pad will be constructed around the valve box. Free drainage will be maintained away from the valve box and a compressible gasket-type casing cap will be provided to prevent surface water infiltration into the well. Figure A-1 is a diagram of a typical monitoring well flush with the ground surface.

For non-traffic areas, aboveground surface completion techniques may be used. For aboveground monitoring wells, the riser pipe should extend 18 to 24 inches above ground surface. The extended riser pipe will be shielded with a 6-inch-diameter protective steel casing with locking cover. The protective casing will be seated in the concrete surface seal filled with sand, weep hole drilled at the base and surrounded by a 1.5 to 2-foot diameter concrete pad that slopes away from the well. Figure A-2 is a diagram of a typical monitoring well completed above ground surface. Three, 4-inch-diameter, concrete-filled steel guard posts will be installed if the well is in an area that needs protection. Guard posts will be 6 feet in total length and installed radially from each well installation. Guard posts will be recessed at least 3 feet into the ground, set in concrete and filled with concrete.

### *A.4.2 Well Development*

Monitoring wells will be developed by surging then bailing or pumping water at 15-minute intervals until 3 to 5 casing volumes of water have been removed from the well and sounding indicates loose material has been removed from the bottom of the monitoring well. Before well development, equipment will be decontaminated

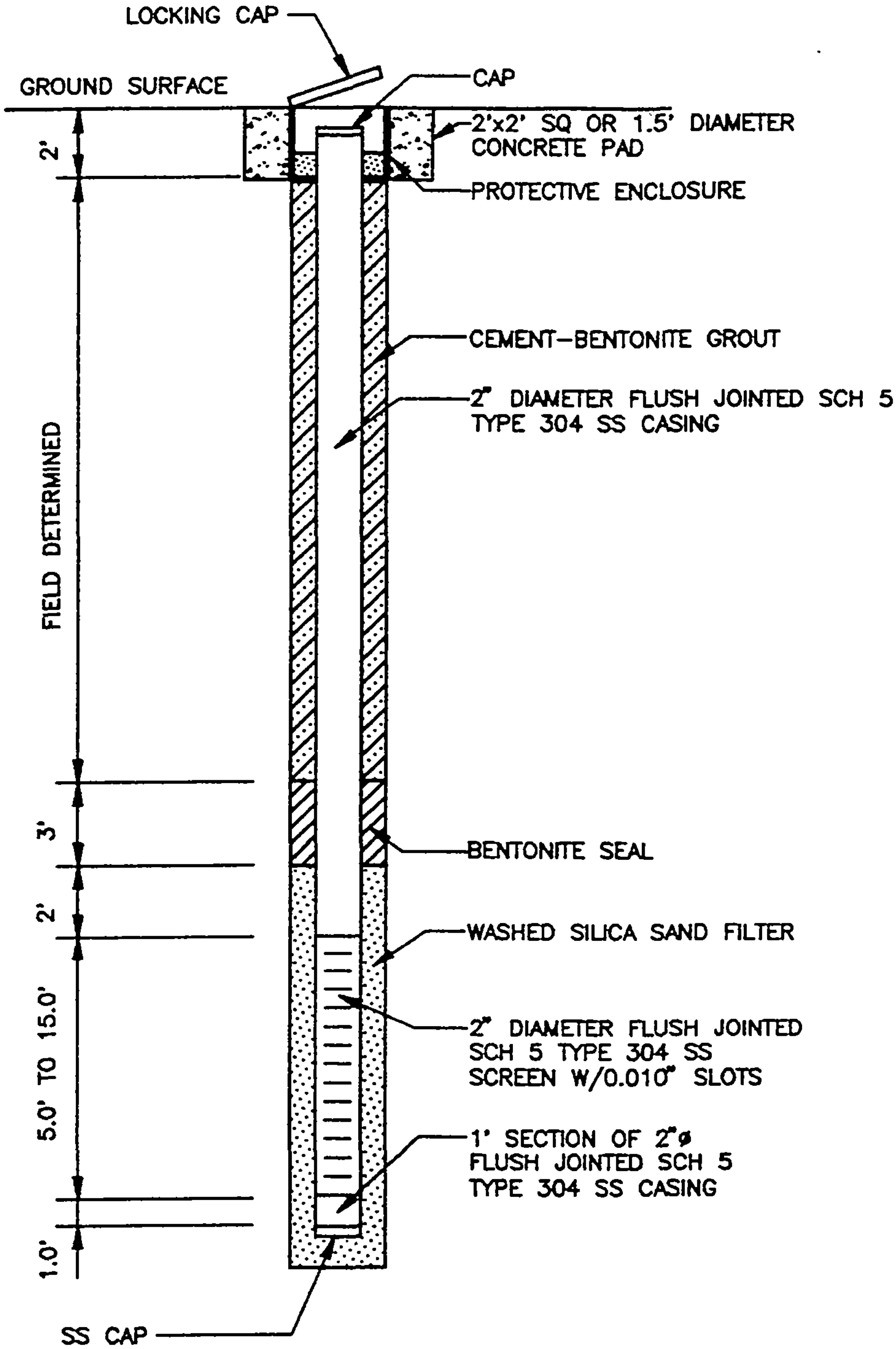


**FIGURE A-1**
**TYPICAL FLUSH**
**MOUNTED MONITORING WELL**

American Chemical Services

40272.702
0799SKINCADE ACAD 12_c3 ORIGINAL DWG SIZE 8.5 x 11
OUTLINE 1=1 CAD DWG NO: C0004347
06/13/95 14:56:24

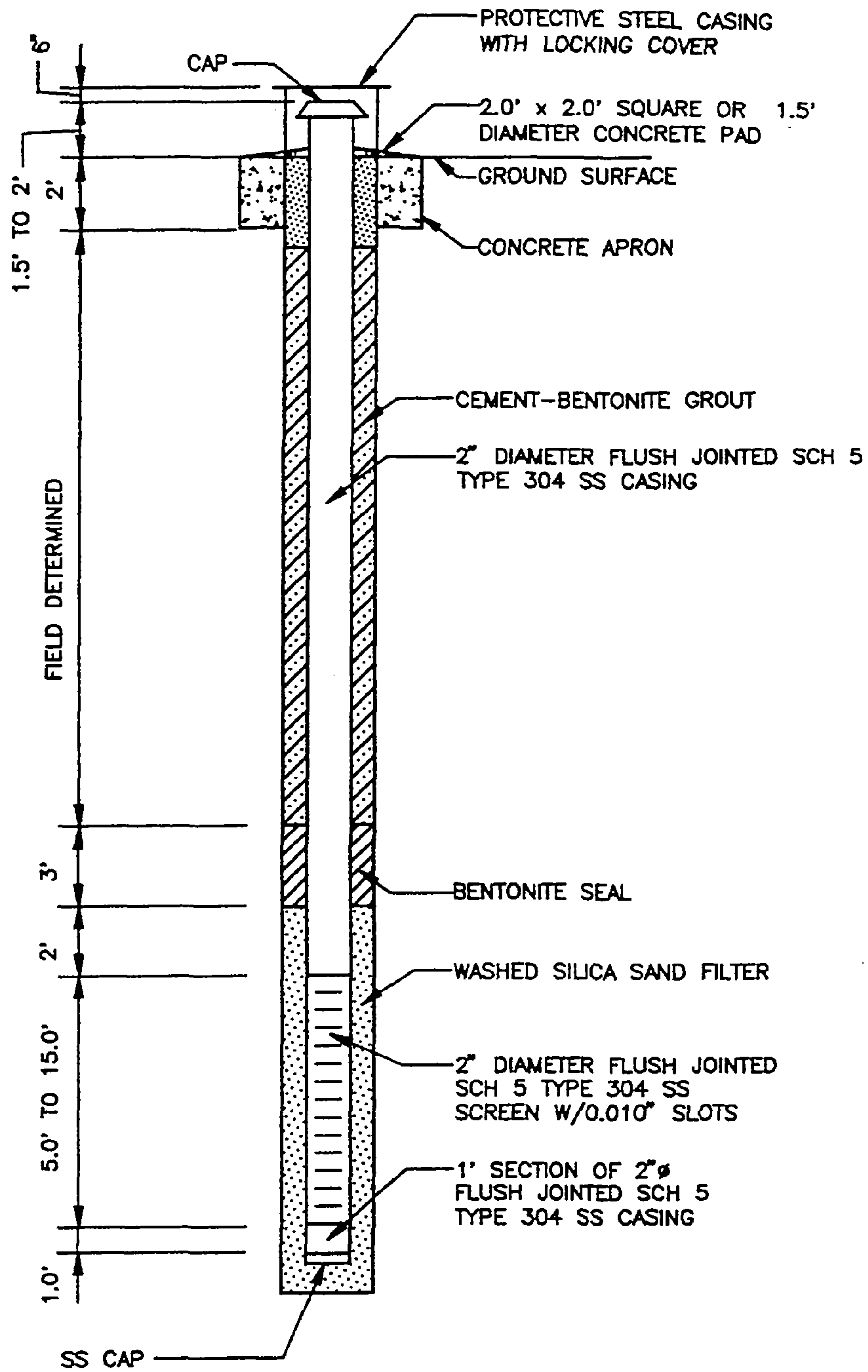


FIGURE A-2
TYPICAL ABOVE GROUND
MONITORING WELL

American Chemical Services

40272.702
07995KINCADE ACAD 12_c3
OUTLINE 1=1
06/13/95 14:57:52
ORIGINAL DWG SIZE 8.5 x 11
CAD DWG NO: C0004348

following procedures outlined in Section A.9. Well development will be the responsibility of the drilling subcontractor under the direction of BVSPC personnel. Section A.8 describes collection and containment of development water.

## A.5 Groundwater Sampling and Hydrogeology Investigation

### *A.5.1 Water Level Measurements*

Before sampling each monitoring well, a static water level measurement will be obtained. An Olympic Well Probe, Model 150 or equivalent, will be used for water level measurements. Field personnel will use the following procedure to measure water levels:

- Wash the cable portion that will enter the well with laboratory detergent and potable water and rinse with distilled water.
- Check well probe batteries. Turn on probe and place probe tip in a glass of distilled water. Note instrument response as the tip contacts the water. If no response occurs, replace batteries and check again. Repeat procedure each day that well measurements are taken.
- Lower probe tip into well by pulling cable from hand-held reel until light comes on or buzzer sounds.
- Move cable up and down while indicator is observed. Record exact cable length, to nearest 1/100th of a foot, extended from probe tip to top of well casing. Record station number, time and date of measurement in a field logbook. Repeat process to verify water level in well.
- Decontaminate cable by spraying with distilled water and wiping with paper towels as cable is rewound. If residue remains, wash cable with laboratory detergent and potable water and rinse with distilled water.

### *A.5.2 Groundwater Sampling and Field Measurements*

Following measurement of static water level and measurement and/or collection of nonaqueous phase liquid, wells will be purged with a dedicated bailer until 3 to 5 casing volumes of water have been removed. Purge water will be collected as specified in Section A.8. Sample containers for volatile organic analyses will be filled first. Each 40-ml vial will be filled completely, with no visible air bubbles, and placed in an iced cooler for preservation. Next, containers for semivolatile organic analyses will be filled, followed by containers for pesticides/polychlorinated biphenyls, metal, and cyanide. The last containers filled will be those for water quality criteria parameter analyses. The mini-QAPP outlines preservation requirements for each analytical fraction.

Following the primary filling of sample containers for each groundwater sample, the following procedure will be used to obtain field measurements of pH, specific conductance and temperature:

- Withdraw water from well and pour into a clean glass container.
- Measure temperature immediately after collection with a thermometer and record in a field logbook.
- Adjust specific conductance meter for temperature. Measure to three significant figures and record in a field logbook.
- Measure pH using a pH probe. Report to two decimal places in a field logbook.
- Measure and average specific conductance and pH three times. Rinse probes with ethanol or isopropanol, if necessary, and distilled water between readings.
- Dispose of water obtained from each well in a drum containing purge water from the same well.

### *A.5.3 Slug Testing Procedures*

Slug tests will be performed on monitoring wells following groundwater sampling to determine hydraulic conductivity and transmissivity values of the water-bearing unit in which the well is screened. Slug tests will be performed using an electronic data logger with pressure transducers. If a well is judged to be too contaminated, field measurement permeability equipment will not be used and a manual slug test will be performed. The following procedures will be used to perform electronic slug tests:

- Measure water level as described previously.
- Place pressure transducer from data logger below water surface to a depth sufficient to allow a reasonable change in head and to allow water to return to a static level.
- Create head differential while simultaneously starting data logger.
- Discontinue test once the change in water column height is less than 0.01 feet for a minimum of three consecutive readings. Label and save printer paper.
- Press stop button and reset.

- Remove equipment from well.
- Decontaminate equipment according to procedures outlined in Section A.9.

Additional slug test information can be found in the manufacturer's information that accompanies slug test equipment.

Manual slug tests can be performed in two ways:

- Fill monitoring well to top of casing with water from a potable source. Monitor decrease in water level for 30 minutes or until measurable decreases in water level cease.
- Remove up to three casing volumes of water from monitoring well and monitor water level recovery for 30 minutes or until measurable increases in water level cease.

Hydraulic parameters are calculated using slug test data. Hydraulic conductivity is calculated using the Hvorslev method and transmissivities and storativities are determined using the Cooper curve matching method.

### A.5.4 Monitoring Well Source Sampling Procedures

Material encountered in monitoring wells located in or near source areas may be present in three separate phases. The first possible phase is a light non-aqueous phase liquid (LNAPL), such as BTEX compounds. Below this is the second possible phase, which consists mostly of water. Located below the second phase is the third possible phase, which is a dense non-aqueous phase liquid (DNAPL). Representative samples of each phase may be collected and submitted for chemical analysis. Before samples are collected, depth to the top of the upper two phases will be determined using an oil-water interface probe. The field sampling team will use the following procedure to obtain these measurements:

- Before mobilizing the instrument to the field, check the probe batteries by turning on probe assembly and immersing it initially in a container of water, then into a container of clean lube oil or equivalent. Note instrument response as probe tip contacts each fluid. If no response occurs, replace the unit's 9-volt battery. Repeat this procedure each day the unit is used.
- Before first use in the field, wash the probe and portion of cable that will enter the well using the standard procedure for decontamination of sampling equipment outlined in Section A.9.

- Lower the probe tip into the well with the hand-operated crank connected to tape reel assembly until a continuous audible tone is heard and the yellow light turns on. Move cable up and down while indicator is observed and record exact length of extended cable to nearest 1/100th of a foot. Record sampling location, time and date of measurement in a field logbook. Repeat this process several times to verify the LNAPL level.
- Determine the product/water interface by continuing to lower the probe tip until the audible signal changes from a continuous tone to an interrupted tone and the red light flashes. (The yellow light goes out when the red light flashes). Proceed as described previously, then decontaminate the probe tip and cable as outlined in Section A.9.
- Determine approximate interface of water and DNAPL using a weighted cotton string or transparent bottom filling bailer.

After completing the measurements, a LNAPL sample will be obtained. A disposable bailer capable of releasing fluid through a valve at the bottom will be lowered into the well. Water accidentally sampled will be released through the valve on the bailer leaving only the light hydrocarbon phase. Section A.5 describes disposal of released water. The light hydrocarbon phase will be transferred to appropriate sample containers.

A variation of the preceding procedure will be used to sample the aqueous phase. The same type of bailer will be lowered into the well and a sample composed of both the first and second phases will be obtained. Once again, the valve at the bottom of the bailer will be used to release the aqueous phase. However, the aqueous phase will be transferred to appropriate sample containers and the LNAPL will be disposed of as described in the Section A.8.

DNAPL will be collected using a peristolic pump and tygon tubing. The tubing will be lowered into the source area to retrieve the DNAPLs. When brought to the surface, the sample will be visually inspected to determine whether other phases are present. If other phases are present, they will be removed by pouring or scooping them off with a stainless-steel scoop or spoon until a sample composed of only DNAPL remains. Section A.8 describes disposal of the phase or phases removed. The DNAPL sample will be placed in a clean stainless-steel collection vessel and transferred to appropriate sample containers.

## A.6 Sediment Sampling Procedures

Sediment samples will be collected using a stainless steel spade to collect sediment from designated locations within sediment deposit areas. Sediment from each sample location will be divided into three portions. The first portion will be placed immediately in a 4-ounce glass jar and sealed. The second portion will be placed in a plastic cup and covered with aluminum foil. The third portion will be placed in a stainless steel mixing bowl.

A visual inspection and head space analysis will be conducted on the sample portion placed in the plastic cup. The headspace analysis will be performed by pushing a PID probe through the aluminum foil and recording the highest instrument reading. The PID readings will all be taken in a consistent manner leaving the sample in the jar approximately one to two minutes before taking the readings. The first 4-ounce glass jar filled will be used for volatile organic analysis.

The third portion that is placed in the stainless mixing bowl will be thoroughly mixed to obtain one composite sample. The composite samples will be transferred to two 8-ounce glass jars and analyzed for semivolatile organics, pesticide/polychlorinated biphenyls, metals, and cyanide.

## A.7 Surface Water Sampling Procedures

The following suggestions will increase the probability that the samples obtained are representative of site conditions.

- The most representative samples of a well-mixed stream are obtained from mid channel at 0.6 of the stream depth.
- Stagnated areas in a stream or river can have zones of varying pollutant concentrations, depending upon the physical/chemical properties of the contaminants and proximity of these stagnated areas to the source.
- When sampling in running water, move from downstream to upstream to eliminate sediment loading in subsequent samples.
- To aid sampling a standing body of water, the surface area may be divided into grids. A series of samples taken from each grid can be combined into one sample, or several grids may be selected for sampling at random.
- Avoid agitating the water during transfer from source to bottle, so as to prevent the loss of volatile constituents.

- When slowly filling 40 ml septum vials for volatile organics analysis, exclude any air space in the vial and be sure the Teflon liner faces in when closing. After sealing, turn vial upside down and shake to check for air bubbles. If air bubbles are present, fill bottle with more sample and reseal.
- Do not sample at the water surface, unless sampling specifically for a immiscible constituent on top of the water. Instead, invert the sample container, lower it to the chosen depth, and hold at about a 45-degree angle with the mouth of the bottle facing downstream.
- For a small stream, seep, spring, pool, etc., the water may be too shallow or inaccessible to directly insert the sample bottle. Instead, use a stainless steel ladle to dip the water out and into the sample bottle. Minimize agitation of the sample during transfer.

### *A.7.1 Shallow Surface Water Sampling Procedures*

Because surface water can be a major pathway for contaminant transport, it is important to obtain samples with high probability of providing definitive information on migration. The character of site drainage and its relationship to possible sources on a site must be studied to select productive sample locations. Samples from shallow water can be manually collected by submerging the sample container into the water. This method is preferable if the water could lose contaminants by transfer from a collection vessel to a sample container. When surface waters are contaminated with significant levels of hazardous substances, the external surface of each sample container must be decontaminated. As alternatives, glass jars or stainless steel or plastic kitchen ladles can be sampling devices. To collect samples further from the shore, first attach a varigrip clamp to a lightweight aluminum pole or piece of PVC pipe. Then clamp sample container onto the pole.

1. Select sampling location(s).
2. Determine the type of sample container and the required sample volume.
3. Always stand downstream of the sample collection point. If a number of samples are to be taken, start at the farthest point downstream and work upstream. Using a gloved hand, slowly submerge sample container into the water. Keep water surface disturbance to a minimum. Remove the container

from the water when the container is filled. Secure the lid on the sample container.

4. Decontaminate the sample container exterior.
5. Determine type of chemical preservative, if any, to add to the water sample.
6. Complete a Sample Identification Tag for the sample.
7. Place a sample identification tag on each sample container and place each sample jar into a plastic bag; transfer the jars to a cooler where it will be cooled with ice.
8. Complete a chain-of-custody form.

Shallow Surface Water Sampling Supplies

| | |
|---|---|
| Sample containers | Stainless steel or plastic kitchen ladles (optional) |
| Marking Pens | Sample gloves |
| Paper towels | Zip-lock plastic bags |
| Cooler and ice | Trash bags |
| Tap water dispenser | Wash tub, detergent, and brush |
| Distilled water dispenser | Sampling paperwork |
| pH meter | Sample preservatives, if necessary |
| Thermometer | Conductivity meter |

### *A.7.2 Deep Surface Water Sampling Procedures*

Because surface water can be a major pathway for contaminant transport, it is important to obtain samples with high probability of providing definitive information on migration. The character of site drainage and its relationship to possible sources on a site must be studied to select productive sample locations. Collection of deep water samples requires specialized sampling devices. Several types of sampling devices are available, including the Kemmerer and Van Dorn samplers. All are designed to be lowered to a desired depth, then a messenger weight causes the sampler to snap shut, trapping the water sample inside.

1. Select sampling location(s) and depth(s).
2. Determine the required amount of sample.
3. Attach sampler to nylon rope. Tie the free end of nylon rope to a fixed support to prevent accidental loss of the sampler. Open and set stoppers on sampling device. Lower device to desired depth and drop messenger weight to activate sampler closure.

4. Raise the sampling device from the water. Open one stopper and decant the water sample into a marked sample container.
5. Determine type of chemical preservative, if any, to be added to water sample.
6. Complete a Sample Identification Tag after each sample is collected.
7. Secure the lid and sample identification tag on each sample container and place each sample jar into a plastic bag; transfer the jars to an iced cooler.
8. Record required sample information in sample logbook and complete a chain-of-custody form.

<u>Deep Surface Water Sampling Supplies</u>

| | |
|---|---|
| Nylon rope | Subsurface sampling device (Kemmerer or Van Dorn) |
| Sample containers | Marking pens |
| Sample gloves | Plastic bags |
| Cooler and ice | Trash bags |
| Tap water dispenser | Detergent, wash tub, and brush |
| Thermometer | Wash bottle with distilled water |
| Sampling paperwork | Sample preservatives, if needed |
| pH meter or test strips | |

<u>Water Sampling Equipment</u>

| | |
|---|---|
| Air Lift Pumps | Automatic Dispenser (pipettor) |
| Bailers (Stainless Steel) | Bucket Auger (3" w/handle) |
| Buffer Solutions (pH 4, 7, 10) | Chain-of-Custody Seals. |
| Container Brush | Conductivity Meter and calibration solutions |
| Containers (caps lined w/Teflon) | Dissolved Oxygen Indicator (w/probe for field) |
| Distilled Water | Electrical Tape |
| Groundwater flow meter | Grease pencils |
| Hip Boots | Nansen-Style Bottles (water sampling with case) |
| Oil absorbing pillows | Pitcher Pump |
| pH Meter and pH Hydrion paper | Plastic Beaker (1000 ml) |
| Polyethylene Bags | Pressure Filtering Apparatus |
| 0.45 micron filters and prefilter | Pulley |
| Rope (nylon, 3/16" and 1/4") | Safety goggles |
| Sampling Pump (w/add-on head) | Stainless Steel Safety Lab Can |
| Submersible Pump (2" and 4") | Thermometer (armored 305 mm) |
| Thermometer (yellow, 20-1100) | Tubing (silicone 0.433" OD) |
| Tubing (teflon, 1/4") | Turbine Pump and Generator |
| Wash Bottles (500 ml) | Wash Bailer (teflon or stainless steel). |
| Water Level Indicator (elect or tape) | Well Pump (peristaltic) |
| Whirlpak Bags | Wire Tags |

## A.8 Field Investigation-Derived Wastes

Investigation-derived wastes include drill cuttings, plastic sheeting, decontamination fluids, groundwater removed from wells during development and purging, source materials removed during sampling, disposable sampling equipment and disposable health and safety materials. The following sections discuss procedures for handling these wastes and labeling drums.

### *A.8.1 Solid Materials*

Drill cuttings, plastic sheeting, solid source materials removed during sampling, contaminated disposable sampling equipment that cannot be reasonably decontaminated and contaminated disposable health and safety materials will be segregated according to sampling location and material type and placed in Department of Transportation (DOT) specified 55-gallon drums or in covered roll-off boxes lined with high density polyethylene. Disposal of these materials will be based on results of chemical analyses performed on soil, water and source samples. Disposable sampling equipment and health and safety materials not visibly contaminated will be double-bagged in plastic trash bags and disposed of at an onsite location where solid waste is disposed of (i.e., trash dumpster or container). If no such location exists, these wastes will be disposed of as directed by USEPA.

### *A.8.2 Liquid Materials*

Decontamination fluids, groundwater removed from wells during development and purging and liquid source materials removed during sampling will be placed in a temporary polyethylene tank. At least 6 inches of freeboard will be allowed, if the tank becomes completely filled. The disposal method for these liquids will be based on the results of chemical analyses performed on groundwater and source samples.

### *A.8.3 Labeling*

The following information will be placed on both the side and top of each DOT-specification drum:

- Site location.
- Sampling location.
- Type of waste.
- Date of investigation.

The following is an example of this information:

Example: American Chemical Services
Soil boring SB03
Soil cuttings
12/25/96

## A.9 Decontamination Procedures

### *A.9.1 Drilling Equipment Decontamination*

Procedures for equipment decontamination will be implemented to avoid cross-contamination of subsurface strata and various media sampled. The drill rig and all drilling and sampling tools will be thoroughly cleaned and decontaminated before initial use.

Initial decontamination will be performed in two separate phases. The first phase will be performed before moving equipment to the site. In this phase, equipment required to perform drilling and sampling will be thoroughly cleaned. Any encrusted soil, mud or organic matter adhering to the equipment will be removed using a high pressure potable water wash. Equipment and materials subjected to this decontamination phase will include, but not be limited to, the drill rig, pumps, drill rods, augers, drill bits, threads, steel casing, sampling equipment and other tools and materials required to complete soil borings and monitoring wells.

The second phase of initial decontamination will be performed onsite at a location where spread of contamination before and during field activities can be controlled. The area will be made into a decontamination pad consisting of a sturdy base, lined with high density polyethylene. The decontamination pad will have four raised sides and a sump for collection of fluids. All decontamination pad wastewater and any potentially contaminated materials remaining on the pad after the decontamination process is performed will be managed according to Section A.8.

The second phase of initial decontamination for sampling equipment includes the following steps:

- Wash with laboratory detergent and potable water.
- Rinse with potable water.
- Rinse with reagent grade ethanol or isopropanol if grease or oil is observed.
- Rinse with distilled water.
- Air dry.

- Wrap in aluminum foil, if necessary, to prevent contamination before use.

The second phase of initial decontamination for drilling equipment consists of the following steps:

- Wash with a high pressure steam cleaner using laboratory detergent and potable water.
- Rinse with high pressure steam cleaner using potable water.
- Rinse with reagent grade ethanol or isopropanol, if necessary to remove grease or oil.
- Air dry.
- Rinse with potable water.

Decontamination of drilling equipment between borings and monitoring wells (i.e., intermediate decontamination) will include augers, drill rods, drill bits and all other tools and equipment considered contaminated. The procedure used during the second phase of initial decontamination for drilling equipment will be used during intermediate decontamination.

Intermediate decontamination of sampling equipment will be required between sampling attempts, as well as between different boring locations. Intermediate decontamination procedures for sampling equipment are the same as those outlined for the second phase of initial decontamination.

To prevent the movement of contaminants into offsite areas, final decontamination of all equipment used to drill and sample borings and construct monitoring wells will be required before equipment demobilization from the site. Final decontamination will be performed at the decontamination pad and will be verified by BVSPC field personnel. Final decontamination will include, at a minimum, the drill rig, pumps, augers, sampling equipment and any tools used during drilling. The procedures used during intermediate decontamination will be used during final decontamination.

### *A.9.2 Sampling Equipment and Monitoring Well Materials Decontamination*

Sampling equipment and monitoring well materials including stainless steel riser pipe, screen, bailers and soil sampling equipment will be decontaminated before installation or use by steam cleaning followed by a distilled water rinse. No solvent rinse will be used to decontaminate the riser pipe, screen or bailers.

The pH meter probe, specific conductance probe and thermometer used for field measurements will be rinsed with ethanol or isopropanol, if necessary to remove visible oil or grease, and washed with distilled water after each use.

Field measurement permeability equipment (i.e., slug bombs) will be decontaminated before, between and at the completion of usage. The decontamination procedure to be implemented will consist of the following:

- Wash with laboratory detergent and potable water.
- Rinse with potable water.
- Rinse with reagent grade ethanol or isopropanol.
- Rinse with distilled water.

Field measurement permeability equipment will not be used in wells known to be oily or in a condition that would make decontamination of the equipment difficult.